there is any suspicion at all of pelvic abnormality or undue smallness, as revealed by the patient's build, and our ordinary external examinations of the pelvis.

❦

JOHN N. EWER, M.D. (411 Thirtieth Street, Oakland). Increased interest has recently been shown in pelvimetry and classification of pelves by the use of the x-ray. Those who employ it have found external pelvic measurements often deceiving. Doctor Hayden's paper represents an excellent study of this subject, with careful correlation of the labors of the patients concerned.

For a considerable length of time I have been employing roentgen pelvimetry in private practice in all primigravidae and in such multigravidae with a history of difficult labor apparently referable to the size or shape of the pelvis. My series of about three hundred cases parallels the above reported series in most significant respects. As would be expected, there was a definite relationship between the size of the pelvis, as expressed by the obstetric index, and failure of engagement of the head. Both series employed the test of labor whenever possible, which, in my opinion, is not carried out as often as it should be. In this connection, I should like to reiterate one of Doctor Hayden's important points, viz., that the strength and efficiency of uterine contractions are one of the major factors determining the outcome of a given labor. The test of labor is, I believe, the only way to accumulate the experience necessary to form the basis of judgment as to what influence a given size or type of pelvis may have on the necessity for operative delivery. The efficiency of contractions may be the deciding factor in a case of so-called "borderline pelvis." An exact knowledge of a given pelvis will, however, obviate many unnecessary cesarean sections or instances of dangerous procrastination.

The position of the baby does not seem to be influenced to a great degree by either the size or shape of the pelvis after engagement has taken place. The incidence of occiput posteriors requiring interference or born spontaneously as such in my cases has closely paralleled the incidence of the sizes and types of pelves encountered in the whole series. That other factors than the bony pelvis must also be involved in the etiology of occiput posterior is suggested by the fact that, of forty such cases requiring interference, seven were delivered spontaneously in a subsequent labor, and all delivered in occiput anterior, some with surprising rapidity. It would seem poor obstetric practice to advise elective cesarean section to a woman who had had one labor made difficult by anterior rotation failure unless other factors were also present which would make such a decision justifiable.

Modern procedures impose no sacrifice of obstetric art if they invite a closer understanding of the problem involved.

CLINICAL MANAGEMENT OF SKIN CANCER*

By ERIC LILJENCRANTZ, M.D.
AND
GEORGE V. KULCHAR, M.D.
San Francisco

DISCUSSION *by Harry J. Templeton, M. D., Oakland; Clyde K. Emery, M. D., Los Angeles.*

THE proper management of skin cancer depends upon (1) accurate diagnosis; (2) adequate treatment of an adequate area; and (3) energetic follow-up.

Accurate diagnosis entails differentiation between malignant and benign lesions, and, further, in the malignant ones, the exact identification of cell type. We have not found it possible to make these very important distinctions accurately without biopsy.

DIFFERENTIAL DIAGNOSIS BETWEEN BENIGN AND MALIGNANT LESIONS

In general, the distinction between benign and malignant skin lesions is not difficult. We have found the question arises sufficiently often, however, to warrant routine biopsy in all cases of suspected cutaneous malignancy.

The problem can be illuminated far more effectively by reference to the accompanying photographs than by verbal description.

Senile keratoses, along with erythroplasia and Bowen's disease, are among the commonest borderline lesions, and are to be regarded with constant suspicion. Their appearance may be markedly altered by inflammatory changes. Early signs of malignant change may be (1) tenaciously adherent thickened crusts, which leave a finely granular bleeding base when torn off; (2) marginal proliferation and induration, with solid or with pearly nodular rolled edges; and (3) central ulceration, with crusting or cornification. Malignant change may be evident histologically, with minimal clinical evidence.

Sebaceous and epithelial cysts, simple papillomata, and infectious granulomata occasionally may cause confusion. We have made the error of calling benign lesions malignant about as frequently as we have treated malignant neoplasms as benign.

The differentiation between hemangioma and melanoma seldom should be difficult. Occasional deeply situated hemangiomata, however, may be so intensely colored that they closely resemble melanoma. Melanomata may masquerade as infected granulomata.

The comparative rarity of cutaneous sarcoma, endothelioma, lymphoblastoma, mycosis fungoides, and various metastatic carcinomata, and the infinite clinical variety in which they may occur, render exact identification, proper management, and prognosis impossible without accurate histological information.

THE IMPORTANCE OF DETERMINING CELL TYPE IN CUTANEOUS CARCINOMA

Primary skin carcinoma is usually classified as:

1. Squamous cell or epidermoid carcinoma.
2. Basal cell noncornifying carcinoma, or rodent ulcer.
3. Mixed types.
4. Adenocarcinoma (arising in sweat and sebaceous glands).

Our experience, in keeping with that of others, is that the vast majority of skin carcinomata is included in the first two groups.[1,2] Mixed lesions constitute probably less than 5 per cent of skin carcinomata, and the primary adenocarcinomata less than 1 per cent.

The question of histogenesis of these types should be mentioned briefly to call attention to a seeming paradox in the generally accepted termi-

---

* From the Tumor Clinic, Stanford University School of Medicine, San Francisco.

Read before the Dermatology and Syphilology Section of the California Medical Association at the sixty-sixth annual session, Del Monte, May 2–6, 1937.

Squamous Cell Carcinoma Epidermoid or Prickle Cell Type	Basal Cell Carcinoma Rodent Ulcer
Accurate Differentiation Not Possible Without Microscopic Examination	
Relatively short course.	Chronic course—repeated crusting and ulceration, gradual enlargement.
Large (over six to ten millimeters) lesion present less than one year.	Duration over three to four years.
Local circumjacent hyperemia.	Circumjacent inflammation usually absent.
Cornification (not crusts).	Crusting, no definite horny material.
Solid border—elevated, hard, with visible blood vessels.	Pearly nodular rolled edge.
Fetid purulent exudate from late lesion.	Occasional bleeding, serosanguinous discharge.
Location Correlated With Lesion Type—In Itself No Reliance Both Types May Occur Anywhere on Skin	
Principally on mucous membrane, mucocutaneous junctions, and on the extremities.	Chiefly on the face, especially nose, forehead, eyelids, temples, scalp.
Lower lip, penis, vulva.	Upper lip.
Age: Patients usually age 30 to 50.	Age: Patients usually over 50.
Reasons That Make Differential Diagnosis Important	
Metastasize early to regional nodes. Distant metastases not uncommon.	Rarely metastasize at any stage. Persistent tendency to local recurrence. Commonly multiple.
May be relatively radioresistant.	Relatively radiosensitive.

nology. The term "basal cell carcinoma" intimates that these lesions arise from the most actively proliferating layer of the skin; yet these tumors are notoriously slow-growing and histologically well differentiated. On the other hand, the term "squamous-cell carcinoma" implies origin in the most mature layers of the skin. It does not seem likely that such inactive layers should give rise often to poorly differentiated tumors capable of such rapid growth and spread. Haythorn [2] has presented strong evidence, on the basis of both distribution and histology, that typical Jacobian rodent ulcers do not originate in the basal-cell layer. Pending further evidence or wider acceptance of Haythorn's views, it probably would be more satisfactory to use the noncommittal, simple descriptive term, "rodent carcinoma," for the noncornifying lesions, and the term "epidermoid carcinoma," for the cornifying or acanthomatous type.

Epidermoid carcinoma is a malignant neoplasm which spreads by true metastasis, but which may vary in clinical course from indolent localized growth to wild widespread lymph and blood stream dissemination. One thousand autopsies performed on patients with carcinoma at the Stanford University School of Medicine include twenty-four patients dying of epidermoid skin cancer. The mortality from this disease in Willis's series is roughly comparable.

True rodent carcinoma is a locally infiltrating lesion which may vary widely in rate of growth. Although multiple lesions [3] are common, it may be said that rodent carcinoma virtually never metastasizes. The series reported by Haythorn and by Warren et al., contains no instance of metastasis of a rodent carcinoma in over 2,700 cases of skin cancer. Our out-patient clinic records fail to reveal any instance of such metastasis. Willis reports that no proved instance of blood-borne metastasis to viscera has been recorded.[4] Niles [5] carefully searched the literature on this question in 1931. He was able to find "only five histologically proved cases of metastasis of a pure basal-cell epithelioma in which both the original growth and the metastasis were of pure basal-cell type," and reports an additional case of mixed type. The accompanying photomicrocraphs of these metastatic tumors, however, suggest pure noncornifying epidermoid carcinoma.

The extreme rarity of metastasis from rodent carcinoma and the frequency of metastasis from epidermoid only add weight to the importance of distinguishing sharply between lesions with such reliably different habits of growth.

Many clinical criteria exist that are correlated with cell type.[6,7] The commoner ones are listed in Chart 1. We have not found any single clinical criterion or group of criteria, however, that is entirely reliable. The age of the patient may be misleading, as we have found epidermoid carcinoma in many patients over fifty, and have found rodent carcinoma in a few under fifty. The rate of growth and size of the lesions are not reliable indices. Circumjacent erythema is not a definitive sign; cornification is rarely well marked. Also, the appearance of either type of lesion can be profoundly altered by secondary infection.

Location is not reliable. We have encountered epidermoid carcinoma occurring on all the areas usually preferred by rodent carcinoma, namely, nose, forehead, eyelids, temples, and scalp. Rodent carcinoma, likewise, occasionally does occur on the extremities, near the mucocutaneous junction, and on the scrotum, but we have never found it on the lower lip, penis, or vulva.

Perhaps the most helpful sign is the pearly or waxy, rather soft, nodular border of the early rodent carcinoma.

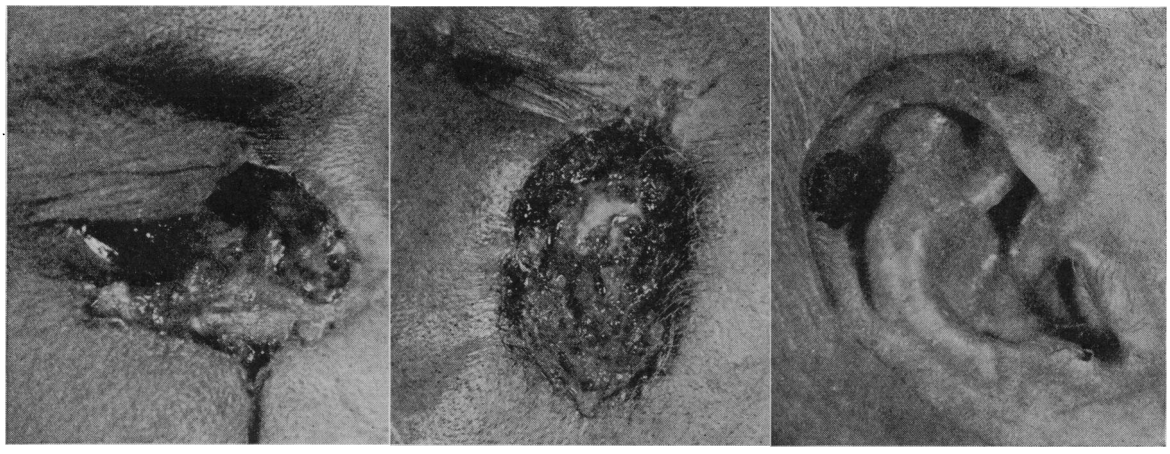

Fig. 1 Fig. 2 Fig. 3

Fig. 1.—Recurrent rodent carcinoma. Patient, aged 45. Lesion undertreated with x-ray ten years before, with radium seven years before, and radium again three years before this photograph was taken. Now badly out of hand. Cure possible only by mutilating operation removing bone and sacrificing eye. Compare with the epidermoid lesion shown in Figure 6.

Fig. 2.—Advanced, maltreated rodent ulcer. Patient, aged 64. Lesion inadequately treated on at least three occasions with radium over ten-year period. Extensive ulceration with secondary infection, fixation, and salivary fistula. Note skin atrophy (postradiation?) at upper pole, and spontaneous pronounced peripheral cicatrizing reaction at anterior edge. The margins are rather flat and irregularly nodular rather than sharply raised. Compare with Figure 9*a*.

Fig. 3.—Epidermoid carcinoma. Patient, aged 75. Both rodent and epidermoid carcinoma are common on and about the ear.

Figures 1-6 show more clearly than words examples ranging from entirely typical lesions of both types in which clinical diagnosis was easy, to strikingly atypical lesions in which exact diagnosis was impossible without histologic examination.

Summarizing the foregoing observations leads us to the conclusion that even fairly dependable diagnosis of skin cancer is frequently impossible without biopsy. In early stages the border line between benign and malignant lesions cannot be determined, and in later stages the important distinction between rodent ulcer and epidermoid carcinomas cannot be made with certainty. Even less accurately can one predict histological grading, or identify mixed or rare types of cutaneous malignancy.

BIOPSY

Microscopical examination of tissue represents by far the most reliable diagnostic aid, but even here questions arise which require careful correlation of the microscopic findings with clinical data.

We do not believe that careful biopsy of skin cancer adds to the danger of metastasis [8] except in the case of melanoma. There can be little question of this when removing tissue from an ulcerative lesion, and in early cases the entire lesion can be excised with less trauma than that to which the patient's everyday activities or a careless clinical examination would subject it. If one wishes to be doubly cautious, biopsy can be delayed until after a course of irradiation has been well started.

Melanoma, benign or malignant, never should be cut into. Electrodesiccation and other irritative measures invite disaster, and are to be strictly avoided. Our experience with malignant melanomata, in keeping with that of other series,[9] forces us to the strong conviction that all pigmented lesions should either be left strictly alone or widely and deeply excised. Degree of pigmentation is not a reliable index of potential malignancy, hence innocent-appearing, faintly pigmented nevi should be approached with the same caution.

TECHNIQUE FOR BIOPSY

The first requisite in performing biopsy is to obtain tissue that is truly representative of the lesion. The specimen removed should include a margin of normal tissue, and should extend deeply enough to give some evidence as to the infiltrative properties of the tumor. This can be done nicely either by removing a deep, narrow wedge of tissue with a pointed, fine scalpel and fine-toothed forceps, or by using a five-millimeter skin punch. We have found the latter instrument particularly satisfactory in yielding a maximum volume of tissue cleanly excised to a satisfactory depth with a minimum of trauma. If the lesion is large, more than one specimen can be taken. Usually, however, the five-millimeter piece will be sufficient to demonstrate even mixed-cell types. Local anesthesia should be injected at the margin. Mercurochrome or other dye applied to the skin will help to identify the surface so that it may be properly mounted in paraffin. The site of biopsy may be cauterized with silver nitrate stick.

TREATMENT

It has been our experience that the method of treatment of skin cancer is not as important as the skill and thoroughness with which the method chosen is applied. Excision, irradiation, and locally destructive methods have been used, and there have been many failures for all three methods.

In considering the results of treatment, one must distinguish clearly between true recurrences and multiple lesions. Difficulties in the diagnosis of putative recurrences also arise. Multiple independent rodent carcinomata are common, and we have

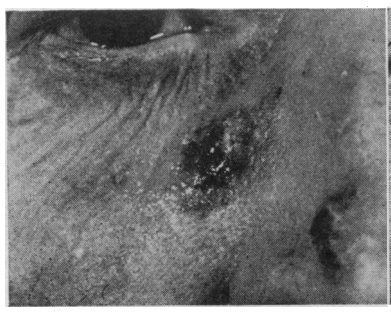

Fig. 4

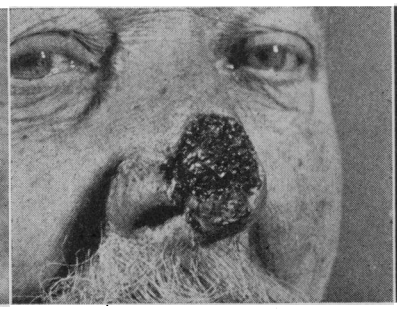

Fig. 5

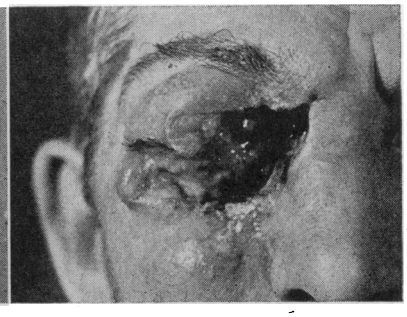

Fig. 6

Fig. 4.—Epidermoid carcinoma. Patient, aged 67. Duration two years. Appearance and location more characteristic of rodent carcinoma.

Fig. 5.—Mixed tumor. Patient, aged 73. Lesion present one year. Had recently grown rapidly following application of tar ointment. Biopsy revealed an invasive rodent carcinoma with acanthomatous (epidermoid) areas. Epidermoid carcinoma not uncommon on nose.

Fig. 6.—Fatal epidermoid carcinoma. Patient, aged 55. Untreated lesion of over three years' duration. Heavy irradiation arrested the primary. Extensive regional glandular metastases occurred. Compare in appearance and prognosis with Figure 1.

seen several instances of rodent ulcer and epidermoid carcinoma occurring in the same patient.

SURGERY

Failure to cure by excision is usually due to the removal of an inadequate amount of tissue. A wide margin must be allowed on all sides of the lesion as well as beneath it. Closure usually can be effected by undercutting or, if necessary, by the use of tissue flaps. Careful planning of incisions, meticulous attention to asepsis, hemostasis, and the avoidance of trauma and tension in closure usually will result in satisfactory cosmetic results even on the face.

IRRADIATION

Failures to cure by irradiation are due to inadequate dosage as well as to the treatment of an inadequate area.

Since many misconceptions prevail concerning the use of radium and x-ray, particularly in regard to choice of quality of radiation, it may be justifiable to mention briefly some fundamental considerations.

QUALITY OF RADIATION

Quality of radiation is determined by the wavelengths present. Rays of short wavelength are spoken of as "hard rays," and conversely those of long wavelength as "soft rays." In the case of radium, quality is influenced by the filtration applied, and in the case of x-rays, by both voltage and filtration. High voltages produce both long and short wavelengths. Heavy filters absorb the former, leaving a hard, emergent beam containing only the shorter wavelengths. In radiation produced at low voltages, the shorter wavelengths are absent.

Quality of radiation has a great influence on the distribution of the physical effect within the body due to differences in absorption of the radiation by the tissues. But the actual physical effect on tissue, once the radiation has been absorbed, is qualitatively hardly at all different, for gamma rays, x-rays, and beta rays (the whole gamut of radiation quality). Differential biological effect is most uncertain.

As an example, one may compare the action of very hard x-rays with that of very soft x-rays. If equal surface doses of these two qualities of radiation be given (to equal areas from the same distance), it will be found that one-half the energy of the soft radiation may be absorbed in the first 2 to 3 centimeters of tissue, whereas in the case of the hard radiation, some 8 to 10 centimeters of tissue may be traversed before one-half of its energy is absorbed.

If one is concerned only with the treatment of superficial lesions, the use of hard radiation possesses no demonstrable advantages. It introduces the disadvantage of irradiating to greater depths than necessary and, therefore, unnecessarily injuring large amounts of tissue.

It should be made clear that the usefulness of the shorter wavelengths, therefore, lies primarily in the ability of such radiation to reach deep lesions rather than upon any superior selective biological action on the lesions once they have been reached. There is no demonstrable difference in such biological actions as production of erythema, or degree of destruction of normal or abnormal tissues, in the superficial layers where the intensities of irradiation are comparable.

The same arguments hold true in comparing the biological action of the gamma rays of radium (of very short wavelength) with that of soft x-rays, namely, that differences in the strata in which these rays are absorbed is a far more important consideration than any differences in biophysical action that may follow such absorption.

The beta rays of radium represent very soft radiation, and are almost entirely absorbed by the first few millimeters of tissue. Once sufficient filtration has been applied to absorb virtually all of the beta rays (0.5 millimeter of platinum or its equivalent) additional filtration does not appreciably alter the quality of the remaining very hard (gamma) rays.

Filtered radium usually is used concentrated and close to the surface, so that the effect is limited to a small volume of tissue. This is due not to absorption, but to the effect of distance. All radiant energy is dissipated in space directly in proportion

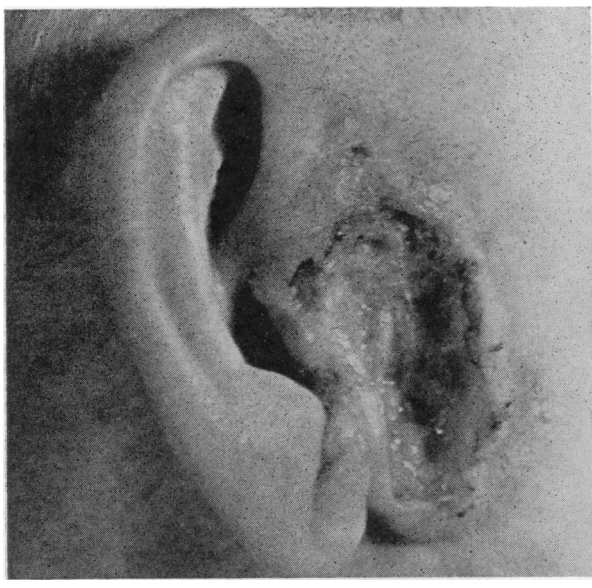

Fig. 7

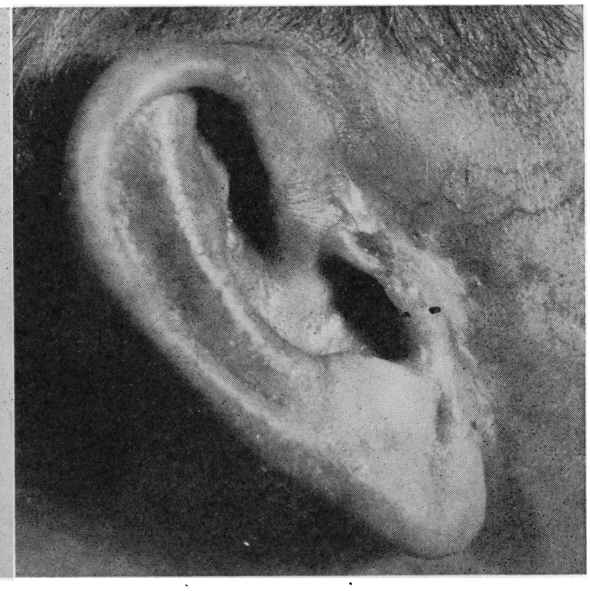

Fig. 8

Fig. 7.—Epidermoid carcinoma. Patient, aged 57. Lesions here are usually rodent carcinoma. Small lesion arose five years previously; cautery was used two years ago. Rapid growth past six months.

Fig. 8.—Same patient as shown in Figure 7 three months after heavy irradiation (6,000 r divided into twelve daily doses of 500 r each to 4 by 7 centimeters oval area).

to the square of the distance from its source (the inverse square law). The skin surface 5 millimeters from a piece of radium gets nine times the tissue dose received by tissue 10 millimeters below the surface.

X-RAY DOSAGE

If the above principles are applied to the treatment of cutaneous lesions with x-rays, it will be apparent that comparatively soft radiation is preferable. In practice, voltages in the range of 90-130 KV are adequate. No filter is necessary for treatment of lesions extending less than one centimeter below the surface. Filtration in excess of one millimeter of aluminum seldom should be required in treating skin cancer.

The limits of x-ray dosage vary sharply with the surface area of the treatment field. For small skin areas, a cauterizing dose of unfiltered x-ray may be given in a single sitting. On the face we have found 3000 r in a single dose safe for areas up to 2½ centimeters in diameter. On hand or foot, we think 1½ centimeter the safe limit for such a single dose, and then only if the circulation is normal.

X-radiation applied in this manner represents treatment by local destruction, and usually suffices to eradicate small local malignant lesions, regardless of cell type. The radiation reaction which follows such treatment usually results in destruction of surface epithelium, with healing by granulation to produce a soft, smooth, inconspicuous scar. The area treated can be very accurately outlined by cutting shields of thin lead to be applied directly to the skin (see Figures 9a and 9b). We cut a special shield for each case.

When larger areas or higher doses have been employed, we have resorted to fractional dosage. Total dosage (measured in air) may vary from 7000 r given in ten daily doses to a 5 square centimeter area, to 4000-6000 r given in daily doses of 200-300 r to areas of 50-150 square centimeter. The larger the area, the smaller are both the daily and the total doses that may be administered with safety. We must calculate, of course, the dose extremely accurately and be certain that the dose is administered exactly as calculated, particularly when using unfiltered x-ray. Short treatment distances [10] may be used by which treatment time may be greatly reduced.

INFLUENCE OF TYPE OF LESION

The cell type of the lesion is to be considered in deciding upon the area and total dosage to be used. We believe epidermoid carcinoma should be given wider margin (7 millimeters for a small lesion, 10 millimeters or even more for a large one) around all visible and palpable tumor, and that the highest total dosage compatible with this area should be given. Rodent carcinoma can be treated with a narrower margin and somewhat lower total dosage (4000-5000 r in divided doses for a large lesion). However, 3000 r should be used for any cutaneous malignancy small enough to treat at a single sitting.

We feel that a marginal recurrence of a rodent carcinoma is still readily curable, but look on recurrent epidermoid as definitely dangerous.

RADIUM DOSAGE

The technique of radium application varies greatly with location of the lesion and type of applicator used (plaque, needles, moulage pack), and cannot be discussed in detail here.[11] Uniform distribution and adequate dosage are essential. Our own practice is usually to use external packs to give gamma radiation from many different points surrounding the lesion, and to calculate the dose

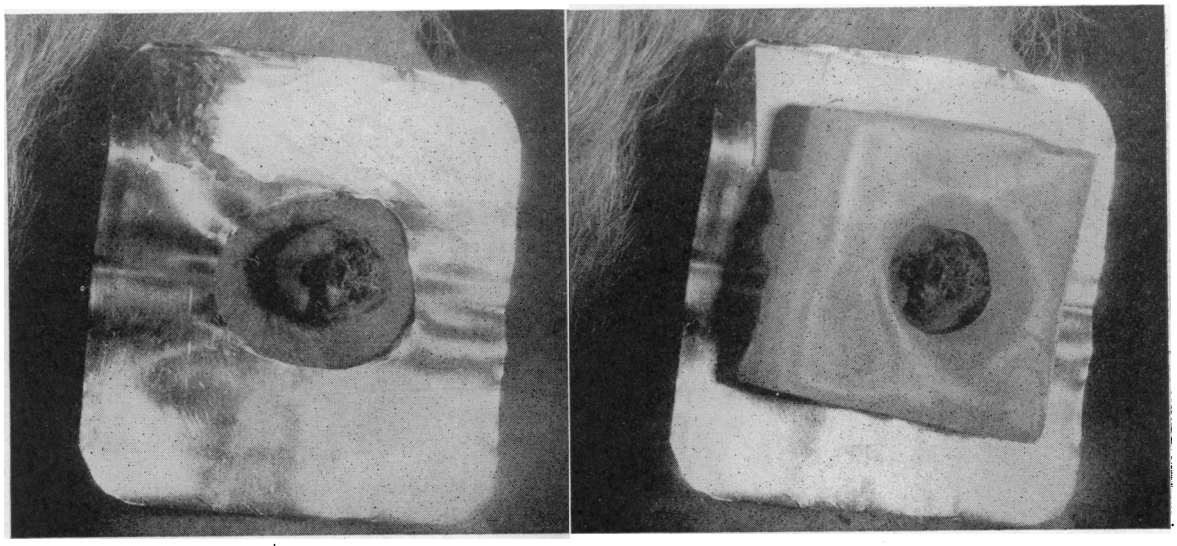

Fig. 9a

Fig. 9b

Figs. 9a-b.—Horny protuberant epidermoid carcinoma recurrent after repeated surgery and irradiation. Patient, aged 87. If direct irradiation of the horn and surrounding skin is used, absorption of radiation within the lesion will result in inadequate dosage being delivered to its base, while a maximum tolerable dose is received by the surrounding skin. Electrosurgery (coagulation or radioknife) may be used to trim the horn to the level of the surrounding skin before irradiating the base, or the method illustrated may be employed.

(a) Shield in place to outline total treatment area (4 by 5 centimeters).

(b) Paraffin block cut to fit closely around the horn to its full height. Absorption of radiation in paraffin is roughly equivalent to that in flesh, so that the underlying skin does not receive higher dosage than does the *base* of the horn.

so that the maximum surface dosage received from all these points is the equivalent of 550-800 milligram hours at one centimeter distance (roughly five to seven threshold erythema doses).

CHOICE BETWEEN RADIUM AND X-RAY

For most cases of skin cancer we believe that it is easier to obtain exactly the desired intensity and uniformity of tissue dose with x-ray than with filtered radium. Also it is possible to confine the irradiation precisely to a definite surface area. Only for very thin lesions is the use of beta ray from a radium plaque satisfactory, for which it is a really elegant tool.

As stated previously, we are unable to recognize any superior biologic effect of gamma rays over x-rays.

PROGNOSIS

The prognosis of skin cancer depends above all upon the anatomical extent of the lesion. Numerous workers report small noninfiltrating epitheliomata of all types cured in over 80 per cent of cases by any of the several acceptable methods adequately applied. Magnusson [12] states that prognosis becomes decidedly less favorable when the tumor exceeds four square centimeters area. Miescher [13] reports 90 per cent primary cures following x-ray treatment for small epidermoid lesions as contrasted with 45 per cent for larger tumors of the same type. Infiltrated tumors present a poorer prognosis. Nielsen [14] reports only 21 per cent five-year cures for such lesions treated with filtered radium plaque. Rodent carcinoma always offer a better prognosis than epidermoid, particularly in more advanced cases. The involvement of regional glands renders complete cure by any method or combination of methods unlikely, although many significant arrests (five years or more) are obtainable through radical treatment.

In the case of epidermoid lesions, histological grading, after the method of Broders [15] or similar schemes, may add valuable prognostic data. It is true that different portions of the same tumor may appear to be of different degrees of malignancy, but this variation usually is over adjacent portions of the scale of malignancy. For example, it is not uncommon to find tissue of both Grades I and II, II and III, or III and IV, from the same tumor, but rarely are Grades I and IV, or even I and III, found in any single lesion.

Ordinarily the more mature or well-differentiated lesions (Grades I and II) grow more slowly and have less tendency to metastasize, while the more anaplastic or poorly differentiated tumors (Grade III and IV) grow more rapidly and metastasize more widely. From the therapeutic standpoint it can be said in general that the maturer tumors are amenable to treatment by complete surgical extirpation, and require really massive doses of radiation for complete destruction. Anaplastic lesions (Grades III and IV) are very radiosensitive. Since attempts at extirpation are likely to cause dissemination, surgical measures should be limited to early localized lesions in this group. The metastases of anaplastic lesions never should be resected.

FOLLOW-UP

The necessity for maintaining an adequate follow-up system should be obvious when one considers the frequency of multiple skin cancers, recurrences, and metastases. This is frequently neglected in both clinic and private practice. Many unfortunate results, as well as time, trouble, and expense, can be spared if the necessity for follow-

up visits is carefully explained to patients at the time they are first treated. We think it preferable to have the fee made for the treatment cover the follow-up visits as well. When this is done, patients are much more willing to return frequently. Specific return appointment cards should be given. When these appointments are broken there should be no delay in using telephone or letter to get in touch with the patient. This is an important direct responsibility of the physician when dealing with cancer of any sort, and should not be neglected.

CONCLUSIONS

1. Accurate diagnosis is essential for correct treatment of skin cancer. Accurate diagnosis is frequently not possible without histological examination.

2. The distinction between rodent and epidermoid carcinoma is of unquestioned practical importance in regard to both treatment and prognosis.

3. Considerable choice of treatment methods exists. The skill and thoroughness with which treatment is applied may be of greater importance than the method selected.

4. Within wide limits the quality of radiation used is of little or no importance. High intensity and uniformity of tissue dose are essential.

5. Conscientious follow-up is of great importance, and frequently is neglected in both clinic and private practice.

2361 Clay Street.
450 Sutter Street.

REFERENCES

1. Warren, S., Gates, O., Butterfield, P. W.: The Value of Histologic Differentiation of Basal Cell Carcinoma. New England J. Med., 215:1060 (Dec. 3), 1936.

2. Haythorn, S. R.: Studies on the Histogenesis of the So-called Basal Cell Carcinoma, Am. J. Cancer, 15:1969 (July), 1931.

3. Willis, R. A.: The Spread of Tumors in the Human Body, page 84. London: J. and A. Churchill, 1934.

4. *Ibid.*, page 127.

5. Niles, H. D.: Metastasis of a Basal Cell Epithelioma, Am. J. Cancer, 15:2341 (July), 1931.

6. Sutton, R. L., and Sutton, R. L., Jr.: Diseases of the Skin, p. 789. Ninth edition. St. Louis: C. V. Mosby Company, 1935.

7. Andrews, G. C.: Diseases of the Skin, p. 912. Philadelphia: W. B. Saunders Company, 1932.

8. Willis, R. A.: The Spread of Tumors in the Human Body, p. 210. London: J. and A. Churchill, 1934.

9. Adair, F. E.: Treatment of Melanoma—Report of Four Hundred Cases, Surg., Gynec., and Obst., 62:406 (Feb. 15), 1936.

10. Spiethoff, B., and Berger, H.: Erfahrungen mit der Röntgen-Nahbestrahlung nach Chaoul bei Karzinomen und Kankroiden der Haut, Dermat. Wchnschr., 102:757 (June 13), 1936.

11. Martin, H. E.: Radiation Therapy in Skin Cancer, Am. J. Cancer, 19:605 (Nov.), 1933.

12. Magnusson, W.: Experience Gained of the Skin Cancer Material of the Radium Hospital (Radiumhemmet) Stockholm, Acta dermatvenereol., 13:475 (Nov.), 1932.

13. Miescher, G.: Statistische Angaben aus der Krebsstatistik der Dermatologischen Klinik, Zürich, Dermat. Wchnschr., 98:420 (April 7), 1934.

14. Nielsen, J.: Statistical Clinical Study of Forms of Cutaneous Cancer, with Special Consideration of Radium Therapy, Ugesk. f. laeger, 95:464 (April 20), 1933. Abstracted in Am. J. Cancer, 21:887, 1934.

15. Broders, A. C.: Carcinoma, Grading and Practical Application, Arch. Path. and Lab. Med., 2:376 (Sept.), 1926.

DISCUSSION

HARRY J. TEMPLETON, M.D. (3115 Webster Street, Oakland).—It seems to me that the ideas presented in the authors' paper represent the last word in radiation therapy of cutaneous malignancies, and that such exact and meticulous technique as they advocate should be used when radiation therapy is indicated. I am certain that both Doctor Liljencrantz and Doctor Kulchar recognize the principle that various types are valuable in the treatment of skin cancer, and that a physician should use whichever adequate method he is most familiar with. Their preference is for radiation therapy. My own belief is that while radiation therapy is invaluable in certain select cases, the average easily accessible cutaneous malignancy can be more certainly cured by methods of local destruction, such as electrodesiccation, electrocoagulation, the actual cautery, or widespread excision. I will base my entire argument upon the fact that certain cancer cells are not radiosensitive, while it is obvious that it is impossible for any cancer cell to resist destruction by electrocoagulation or the actual cautery. Those who advocate radiation therapy will answer this argument by stating that, if they so desire, they can give sufficiently heavy doses of radiation as to produce as thorough a cauterization of the local growth as would a cautery. This is true, but, unfortunately, such heavy doses administer unnecessarily heavy depth doses to cells beyond the area which one desires to cauterize. This accounts for the fact that scars from radiation therapy become more conspicuous, atrophic and telangiectatic as the years go on, while scars from coagulation or the cautery become softer and less noticeable with time.

Because of these facts it is my custom to reserve my radium and x-ray therapy for the weak and aged, and for those epitheliomas which are not easily accessible.

❦

CLYDE K. EMERY, M. D. (445 South Kingsley Drive, Los Angeles).—It is a great comfort to those of us who habitually deal with skin cancer to hear such an excellent summary of the subject as Doctors Liljencrantz and Kulchar have presented. I can only emphasize a few points, primarily that of adequacy of treatment.

We regard radiation treatment as being of two types. First, the cauterizing dose which is given by the soft radiation of x-ray or by radium. The aim in treatment is to kill in one series of treatments all cancer cells. This is comparable to a complete surgical excision, the advantage being that it can be applied to include a wider area of apparently normal tissue. This normal area, we feel, should extend to a full centimeter or more around the average skin cancer, whether basal cell or squamous cell, with particular care being taken to radiate the line of lymphatic infiltration in the case of epidermoid carcinoma. In the case of the noncornifying rodent ulcer, treatment is given to all areas most likely to be involved by direct invasion. In the nasolabial fold, this includes the side of the nose and all tissue between the inner canthus and the upper lip. If radium is given either on the surface or interstitially, an open area should have 5,000 to 6,000 r units of uniform intensity. Around the nose and eyelids it should be reduced 20 to 25 per cent.

The second method of radiation treatment, that of smaller doses over a longer time—as is desirable in treating deep-seated cancer—is seldom necessary on the skin. The occasional treatments, and the handling of skin cancer as though it were a skin infection, cannot be too strongly denounced as inadequate.

I would also stress that portion of the paper which deals with the follow-up, and particularly to heartily concur with the method of making one original fee to cover the entire handling of the case, including all of the subsequent follow-up visits and examinations. This relieves the physician of any uncomfortable feeling of mercenary interest in the patient's subsequent visits, insures more adequate follow-up, and enormously improves the friendly relationship between the patient and the doctor.